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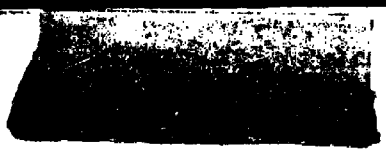

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RESEARCH MEMORANDUM

MEASUREMENTS OF STATIC AND TOTAL PRESSURE THROUGHOUT THE TRANSONIC SPEED RANGE AS OBTAINED FROM AN AIRSPEED HEAD MOUNTED ON A FREELY FALLING BODY

By

C. W. Mathews and J. R. Thompson

Langley Memorial Aeronautical Laboratory
Langley Field, Va.

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NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

WASHINGTON

April 24, 1947

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NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

RESEARCH MEMORANDUM

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By C. W. Mathews and J. R. Thompson

1. Results of tests of an airspeed head mounted on a freely falling body are presented in preliminary form. Measurements were made throughout the transonic speed range. Details and dimensions of the airspeed head and the body are given in figure 1.

2. The variations of static pressure, total pressure, and Mach number with time from release of the test body are presented in figure 2. The dashed curves show these variations as measured by the airspeed head. The solid curves were computed from true airspeed as determined by ground radar tracking records corrected for wind and from correlation of the altitude-time variation of the test body during its fall with the variations of atmospheric temperature and pressure with altitude at the time of the test. The discrepancies between the curves in figure 2, interpreted in terms of the corresponding discrepancy in true airspeed, are shown in figure 3 for the typical case of flight at 30,000 feet. The indicated error in static-pressure coefficient as measured by the airspeed head is presented in figure 4. Since the possible error in the measurement of the static-pressure coefficient due to transmitting and recording may be as much as 0.015, the presented curve should not be interpreted as a final calibration of the airspeed head. It does show, however, that with this type of head the measured error in static pressure was small throughout the transonic speed range.

Langley Memorial Aeronautical Laboratory
National Advisory Committee for Aeronautics
Langley Field, Va.

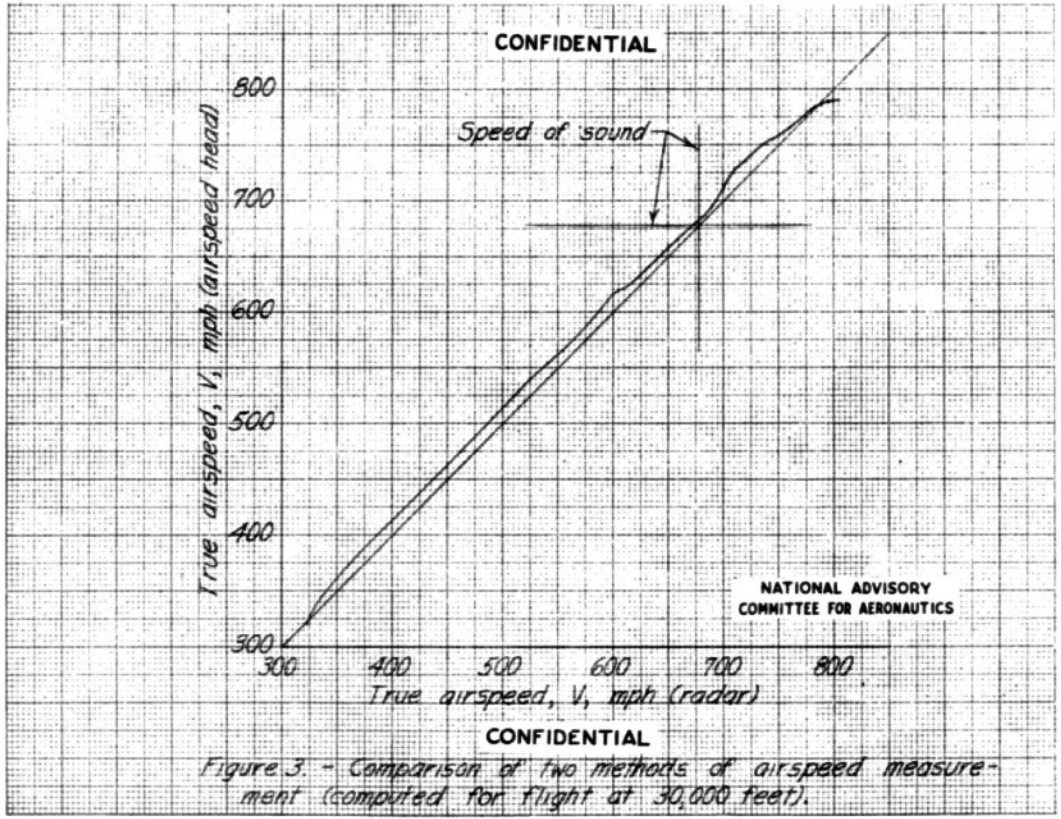

Figure 3. - Comparison of two methods of airspeed measurement (computed for flight at 30,000 feet).

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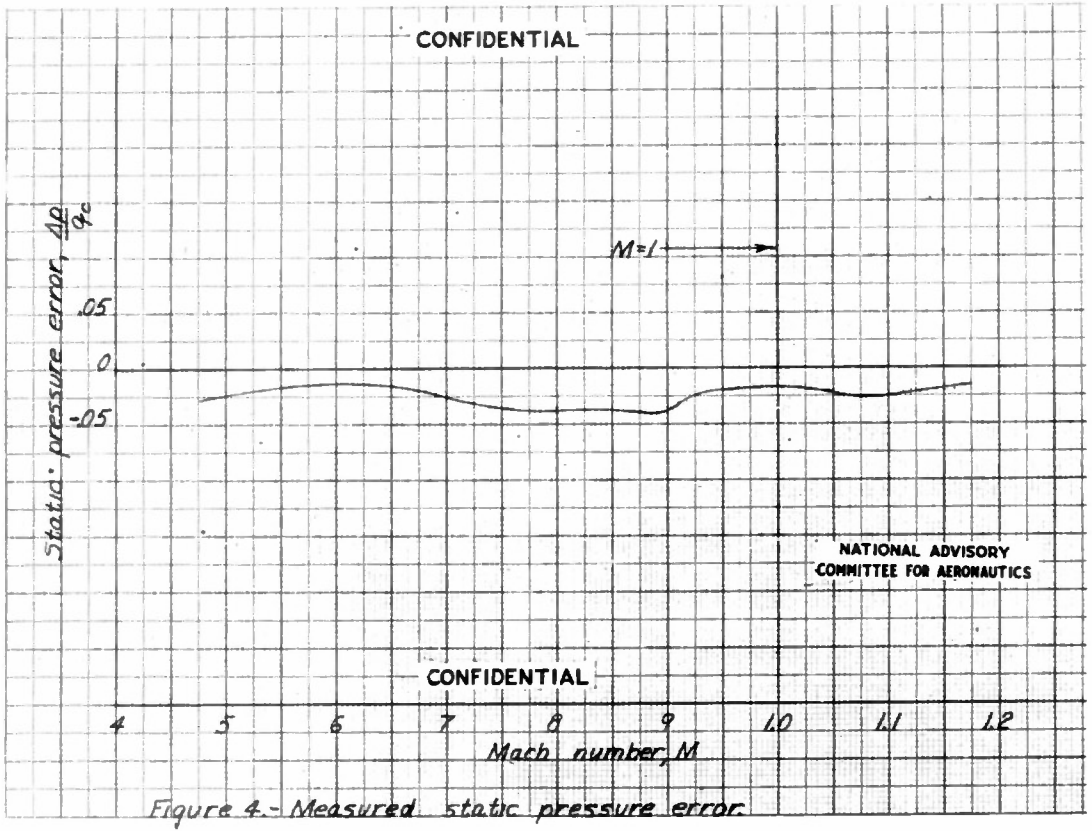

Figure 4.- Measured static pressure error.

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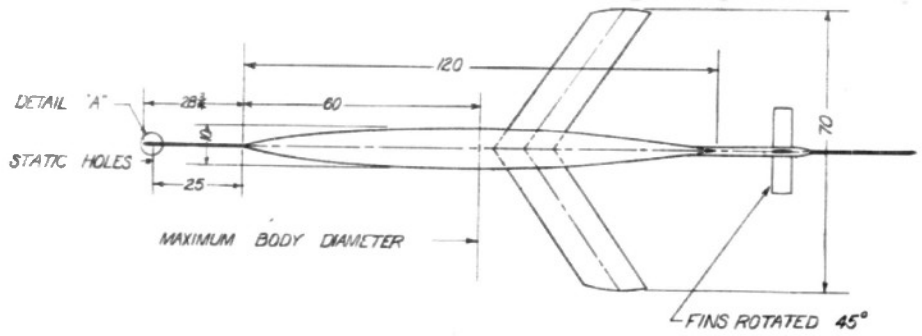

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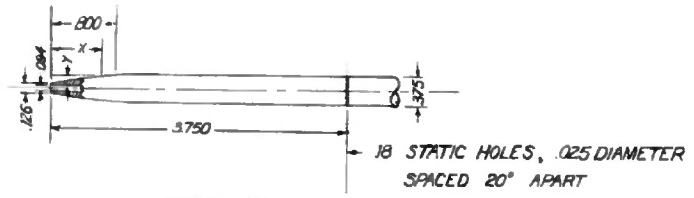

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Figure 1.- Details of airspeed head installation on freely falling body.

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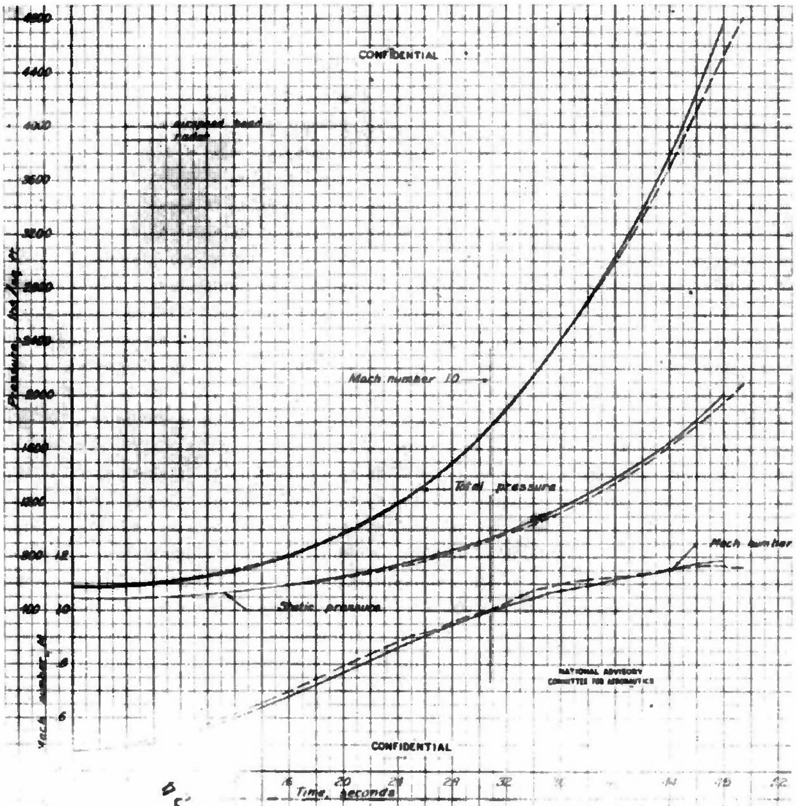
Fig. 1



[illegible] histories of airspeed data obtained from the fall test

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TITLE: Measurements of Static and Total Pressure Throughout the Transonic Speed Range as Obtained from an Airspeed Head Mounted on a Freely Falling Body

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Results of preliminary tests of an air-speed head mounted on a freely falling body are prescribed. Measurements were made throughout the transonic speed range. Details and dimensions of the airspeed head and the body are given along with variations of static pressure, total pressure, and Mach number with time from release of the test body. A comparison of two methods of airspeed measurement and measured static pressure error is made in graphs.

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